

A Process-oriented pedagogy for collaborative game-based learning

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The use of games in formal education and beyond demands a pedagogical model that guides technology-enhanced learning. Deriving inspiration from Connectionist and Constructionist epistemologies, a process-oriented methodology was developed for analysing and managing collaborative game-based learning. Categories of interactions and the major factors that influence them during collaborative gaming were identified. Interactions are categorised at the experiential and metacognitive levels along three dimensions (domain, technology/game and community) and across three pedagogical levels (acquisition, participatory and contributory) characterising novice, experienced and expert learners. This process-oriented pedagogical model attempts to capture the complexity existing in collaborative gaming and thus provides a taxonomic tool for learning and training design.

This model was developed through a number of investigations with a sample of college students. The complexity of interacting variables in collaborative gaming demanded multiple methods for capturing the different dimensions and levels of interactions generated by task and person-oriented processes. Data about individual gaming patterns (time, gaming device, preferred game genre and titles, motivation for gaming) was gathered through a survey. Theme focussed investigations explored how the dependent variable - the collaborative gaming condition, more specifically the type, frequency and directionality of interactions that occur in group-based gaming, affected three categories of independent variables identified during preliminary investigations and observations. Individual factors include personality dimensions, gender-related neuro-cognitive propensities, attitude to gaming and gaming competence. Group-based characteristics comprise group roles, friendship level, composition by gaming competence and composition by gender. Game features comprise 'personal appeal' arising from game genre, perceived usefulness, perceived competence facilitation and perceived need satisfaction. Game design features refer to the degree of autonomy (user control) and interactivity (shareability). Different experimental groups were set up using different combinations of these variables. These experimental sessions were recorded on video and subsequently analysed using appropriate observation and computational protocols. The data was corroborated through informal semi-structured interviews.

The results from the different investigations were compiled in a pedagogical model for managing and evaluating collaborative game-based learning. Since both individual and collective gaming competence were the most influential independent variables, experiential and metacognitive interventions are proposed by the model to promote or manage gamers' competence for each pedagogical level. For novice gamers gaming sessions will be 'Group-based', using the group condition as a pedagogical tool to develop competencies through peer support. At this level the emphasis will be on providing a stimulating physical environment and addressing various restraining factors. Experienced gamers in the 'Group-enhanced' situation share the game within the group and with on-line communities thus learning more through participation. This condition addresses the need for relatedness and affiliation with the contiguous group and with on-line domain and gaming communities. Expert gamers operate more within the confines of the world of ideas and conceptual artefacts, emphasising creative

aspects of gaming and how to merge it with domain learning and knowledge building. The gaming experience is thus more 'Group-shared' because the group serves as a place for sharing their experience in mediating different forms of thinking about gaming, domain knowledge and skills. These contributory and mediation forms of learning and knowledge building address their need for self-actualisation.

The implications of this model and pedagogy will be outlined in relation to the design of serious games and to its use in other technology-intensive collaborative environments.